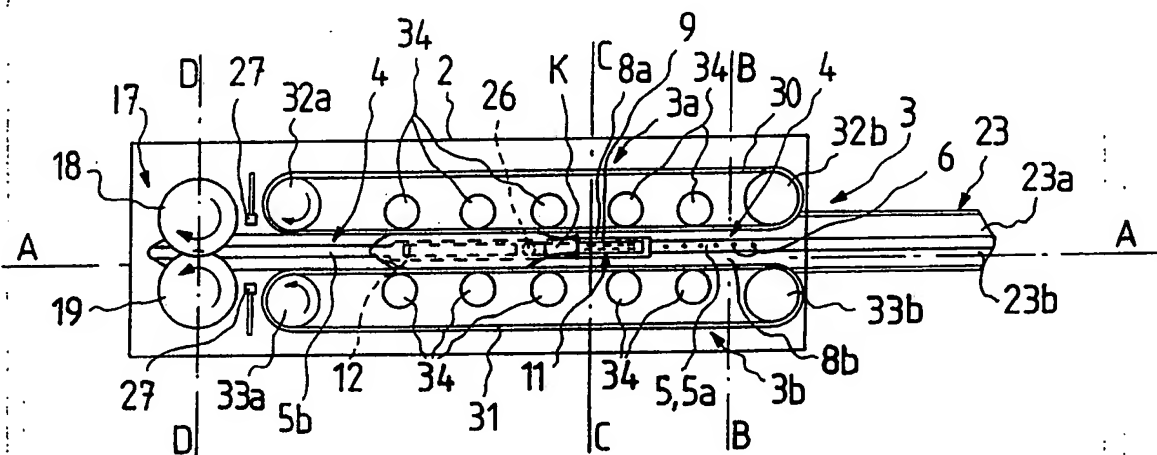




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<p>(21) International Application Number: PCT/FI89/00188</p> <p>(22) International Filing Date: 29 September 1989 (29.09.89)</p> <p>(30) Priority data: 884468 29 September 1988 (29.09.88) FI</p> <p>(71) Applicant: VEPITUOTE OY [FI/FI]; SF-23600 Kalanti (FI).</p> <p>(72) Inventor: KALENIUS, Aimo, Aatami ; Sotkakuja 22, SF-23520 Uusikaupunki (FI).</p> <p>(74) Agent: PAPULA REIN LAHTELA OY; Box 981, Kansakoulukatu 5 A, SF-00101 Helsinki (FI).</p> <p>(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK, FI, FR (European patent), GB (European patent), IT (European patent), LU (European patent), NL (European patent), NO, SE (European patent).</p>		<p>Published <i>With international search report. In English translation (filed in Finnish).</i></p>

(54) Title: APPARATUS FOR THE CLEANING OF FISH



(57) Abstract

The invention concerns an apparatus for the cleaning of fish, comprising a conveyor (3) with its conveying elements (3a, 3b) placed side by side at a distance from each other, between which the fish to be cleaned are conveyed through the apparatus. According to the invention, the apparatus is provided with an elongated supporting element (4) placed between the conveying elements (3a, 3b) of the conveyor (3). At least part of the supporting element (4) consists of a pipe (5). The pipe (5) is provided with holes (6) located in the upper part of the pipe at a distance from each other. The pipe is connected to a source (7) of pressurized water. Mounted in conjunction with the supporting element (4) is a brushing device (10) for internal brushing of the fish. The supporting element (4) serves as a support along which gutted fish are conveyed by the conveyor (3) and washed inside with water and brushed clean.

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APPARATUS FOR THE CLEANING OF FISH

The invention relates to a fish cleaning apparatus as defined in the introductory part of claim 1.

Among the previously known fish cleaning devices there are gutting machines in which fish moving forward on a conveyor are cut open with a knifelike cutter, whereupon the entrails are brushed off. This type of devices are proposed e.g. in Norwegian patent publication 5848 and Swedish patent publication 216,544.

The problem with these devices is that the cleaning result is inadequate. The gutted fish are not washed in the device itself but separately.

A further problem is the complexity of the devices proposed. It is not at all certain that the devices will work in the ways described and that the cleaning result is adequate in view of present-day requirements.

In practice, after the fish have been gutted, they are cleaned manually by spraying the inside with water and brushing. However, such treatment is slow. Moreover, because of the cold water used, it is unhealthy to the worker.

The object of the invention is to eliminate the drawbacks mentioned.

The fish cleaning apparatus of the invention is characterized by what is presented in claim 1.

The fish cleaning apparatus of the invention comprises a conveyor in which the conveying elements are placed side by side at a distance from each other, the fish being conveyed between them through the cleaning device. According to the invention, the apparatus comprises an elongated supporting element placed between the conveying elements of the conveyor, at least part of said supporting element consisting of a pipe provided

with at least one hole and connected to a source of pressurized water, said supporting element serving as a support along which gutted fish are conveyed by the conveyor and washed inside with water.

5 In an embodiment of the apparatus, the pipe is provided with holes placed at a distance from each other.

In an embodiment of the apparatus, the holes are placed mainly in the upper part of the pipe.

10 In an embodiment of the apparatus, the supporting element is provided with a guide of a cross-sectional form widening in the downward direction.

In an embodiment of the apparatus, the guide consists of a pair of longitudinal protrusions laid
15 parallel to the supporting element.

In an embodiment of the apparatus, the apparatus is provided with a brushing device for brushing the interior of the fish, said device being mounted in conjunction with the supporting elements.

20 In an embodiment of the apparatus, the supporting element comprises a guide of a cross-sectional form widening in the downward direction, and a part formed from the guide and provided with an opening through which one or more of the brushes of the brushing device
25 reach the interior of the fish conveyed along the supporting element.

An embodiment of the apparatus is provided with a brushing device for brushing the exterior of the fish, preferably consisting of two rotary brushes
30 revolving on essentially vertical shafts placed on either side of the supporting element outside the coverage area of the conveyor.

In an embodiment of the apparatus, the conveying elements of the conveyor consist of two endless
35 belts, rollers around which the belts move, and runners serving to maintain a suitable distance between the belts for the fish to pass through the apparatus.

In an embodiment of the apparatus, the water pressure in the source of pressurized water is adjustable.

5 In an embodiment of the apparatus, the position of the brushing device mounted in conjunction with the supporting element is adjustable relative to the supporting element.

10 In an embodiment of the apparatus, the position of the brushing device placed outside the coverage area of the conveyor is adjustable relative to the supporting element.

In an embodiment of the apparatus, the distance between the conveying elements of the conveyor and the supporting element is adjustable.

15 The apparatus of the invention provides the advantage that the interior of the fish is effectively cleaned.

A further advantage is that the external cleaning and washing of the fish can also be performed
20 with the same apparatus.

Moreover, the invention enables a faster cleaning process to be achieved while reducing the health risk to workers due to cold water.

25 The invention has the additional advantage that the cleaning result is substantially improved due to the use of pressurized water and the rubbing effect arising from the motion of the fish along the supporting element.

30 Another advantage provided by the invention is that the fish cleaning apparatus can be used for the treatment of most commercial fishes, such as salmon, whitefish, eel, etc.

Other advantages are simple construction, reliable operation and ease of cleaning and maintenance
35 of the apparatus.

In the following, the invention is described in detail referring to the drawing attached, wherein:

Fig. 1 presents the apparatus of the invention in top view.

Fig. 2 presents a longitudinal section A-A of the apparatus in Fig.1.

5 Fig. 3 presents a magnified transverse section B-B representing the region of the conveyor and the supporting element in Figs. 1 and 2.

Fig. 4 presents a magnified transverse section C-C representing the region of the first brushing device
10 in Figs. 1 and 2.

Fig. 5 presents a magnified transverse section D-D representing the region of the second brushing device in Figs. 1 and 2.

The fish cleaning apparatus illustrated by
15 Figs. 1 and 2 comprises a protective casing 2 accommodating the active main components of the apparatus, i.e. the conveyor 3, the supporting element 4 and the brushing devices 10, 17.

The conveying elements 3a, 3b of the conveyor
20 3 are placed horizontally parallel to each other at a distance from each other. The conveying elements 3a, 3b consist of two endless belts 30, 31, rollers 32, 33, around which the belts run, and runners 34 serving to maintain a suitable distance between the belts. The
25 runners 34 are preferably turnably mounted on the casing and loaded by springs so that they press the belts 30, 31 towards the supporting element, enabling the belts to grip the fish to be conveyed between them.

Further, the fish cleaning apparatus comprises
30 an elongated supporting element 4. The latter comprises a pipe 5 which is provided with holes 6 placed at a distance from each other over a suitable range, preferably on the upper side of the pipe 5. The pipe 5 is connected to a source 7 of pressurized water, e.g. the normal
35 water distribution system, using suitable connecting pipes 28. The pressurized water is effectively directed via the holes 6 in the upper part of the pipe 5 towards

the dorsal bone of the opened fish.

The supporting element 4 comprises a guide 8, which is an elongated component of a width increasing in the downward direction, in this case consisting of a pair of protrusions 8a, 8b laid parallel to the supporting element 4.

In the embodiment example illustrated by Figs. 1 and 2, the pipe 5 belonging to the supporting element 4 consists of two parts: the first pipe section 5a and the second pipe section 5b. The pipe sections 5a, 5b are linked by the guide protrusions 8a, 8a laid parallel to the supporting element. Between the protrusions is an elongated opening 9 in the vertical direction. Through this opening, the first brushing device 10 cleans the interior of the fish.

The first brushing device comprises two consecutive rotary brushes 11, 12 with axial quills 13 for brushing the interior of the fish. The rotary brushes 11, 12 are rotated by their shafts by a suitable power means, e.g. an electric motor 16. The electric motor 16 is coupled to the shaft 14 of one 11 of the rotary brushes, which transmits the power to the other brush via a suitable power transmission means, e.g. a belt.

The apparatus further comprises a second brushing device 17, which in the example represented by the drawings is located at the output end of the cleaning apparatus. The brushing device 17 comprises two cylindrical brushes 18, 19, which are preferably somewhat wider at the upper end than at the lower end. The brushes 18, 19 are supported by essentially vertical shafts 20, 21, which are rotated by a power means, e.g. an electric motor 22. The brushes 18, 19 are placed on either side of the supporting element 4 outside the coverage area of the conveyor 3. The second brushing device 17 is used for the cleaning of the exterior of the fish.

Both the first brushing device 10 and the sec-

ond brushing device 17 can be provided with nozzles 26, 27 respectively, communicating via suitable connecting pipes 28a, 28b with the source 7 of pressurized water. The nozzle 26 serving the first brushing device 10 is preferably placed between the two consecutive rotary brushes 11, 12. Thus, the cleaning efficiency of both brushing devices can be improved by means of water jets.

The apparatus further comprises a feeder 23, which is connected to the supporting element 4 at the input end of the conveyor. The feeder 23 is an extension of the supporting element 4 and is mounted in an inclined position such that it has a declivity from the free end towards the supporting element 4 and the conveyor 3. The fish are placed with their open ventral side down onto the feeder 23, along which they will easily slide to the input end of the conveyor 3. The feeder is also provided with a guide, e.g. protrusions 23a, 23b connected to corresponding protrusions 8a, 8b of the supporting element 4.

At the output end of the fish cleaning apparatus, the end of the supporting element 4 is bent to an angle so that it has a slight declivity in the feed direction immediately after the second brushing device 17. For collecting the cleaned fish, a conveyor or a separate box can be provided under the output end of the supporting element 4.

The lower part of the protective casing 2 of the fish cleaning apparatus preferably consists of a basin-like part 2a. The water and the cleaning refuse from the fish are collected in this part and removed via an outlet 29.

In principle, the apparatus of the invention works as follows. The opened and gutted fish are placed on the feeder 23 with their ventral side down so that the dorsal bone rests on the feeder, whereupon the fish are pushed or allowed to slide into the space between

the conveying elements 3a, 3b of the conveyor 3. By means of its conveying elements 3a, 3b, the conveyor 3 pulls the fish along the supporting element 4 and particularly along the pipe 5, jets of water being simultaneously discharged through the holes 6 into the interior parts of the fish K (Fig. 3) while the guide 8 spreads the ventral side of the fish open. The water pressure and the rubbing effect arising from the fish sliding along the pipe 5 and the protrusions 8a, 8b result in at least partial cleaning of the fish.

When the fish arrive at the first brushing device 10, they are still kept open by the protrusions 8a, 8b while the interior of the fish, especially the region near the dorsal bone, is cleaned by means of the rotary brushes 11, 12 applied via the opening 9 between the protrusions. The cleaning efficiency is enhanced by a jet of water obtained via the nozzle 26, which in this case is located between the rotary brushes 11, 12.

After the first brushing device 10, the fish are conveyed further along the second pipe section 5b of the supporting element 4. The second pipe section 5b of the supporting element 4 is preferably also connected to the source 7 of pressurized water via a connecting pipe 28. Consequently, the interior of the fish is continuously washed while the fish are conveyed by the conveyor. However, internal washing is not strictly necessary at this stage.

The fish are cleaned externally by means of the second brushing device 17. The fish delivered from between the conveying elements 3a, 3b of the conveyor 3 are fed in between the cylindrical brushes 18, 19 of the second brushing device 17, which are pressed against the fish and brush them vigorously (Fig. 5), moving the fish out of the cleaning apparatus. Finally, the fish fall down from the inclined part of the supporting element 4 e.g. into a suitable transport box.

The fish to be cleaned are supplied into the

cleaning apparatus in a continuous stream, resulting in a fast cleaning process.

The operation of the fish cleaning apparatus can be adjusted in many ways. For example, the water
5 pressure of the source of pressurized water can be adjusted if necessary. Also, the position of the first brushing device 10 relative to the supporting element 4 can be adjusted, allowing the brushing range of the rotary brushes 11, 12 to be set to suit the species of
10 fish to be cleaned. Similarly, the cylindrical brushes 18, 19 of the second brushing device are adjustable relative to the supporting element 4, and their distance from the supporting parts can be varied. Furthermore, the horizontal distance between the conveying elements
15 3a, 3b of the conveyor 3 can be varied depending on the species of fish to be cleaned.

The invention is not restricted to the embodiment example described above, but instead several variations are possible within the scope of the idea of the
20 invention as defined in the following claims.

CLAIMS

1. Apparatus for the cleaning of fish, comprising a conveyor (3) with its conveying elements (3a, 3b) placed side by side at a distance from each other, between which the fish to be cleaned are conveyed through the apparatus, characterized in that the apparatus is provided with an elongated supporting element (4) placed between the conveying elements (3a, 3b) of the conveyor (3), at least part of said supporting element (4) consisting of a pipe (5) provided with at least one hole (6) and connected to a source (7) of pressurized water, said supporting element (4) serving as a support along which gutted fish are conveyed by the conveyor (3) and washed inside with water.

2. Apparatus according to claim 1, characterized in that the pipe (5) is provided with holes (6) located at a distance from each other.

3. Apparatus according to claim 1 or 2, characterized in that the holes (6) are placed mainly in the upper part of the pipe (5).

4. Apparatus according to claim 1, 2 or 3, characterized in that the supporting element (4) comprises a guide (8) of a cross-sectional form widening in the downward direction.

5. Apparatus according to claim 4, characterized in that the guide (8) consists of two protrusions laid parallel to the supporting element (4).

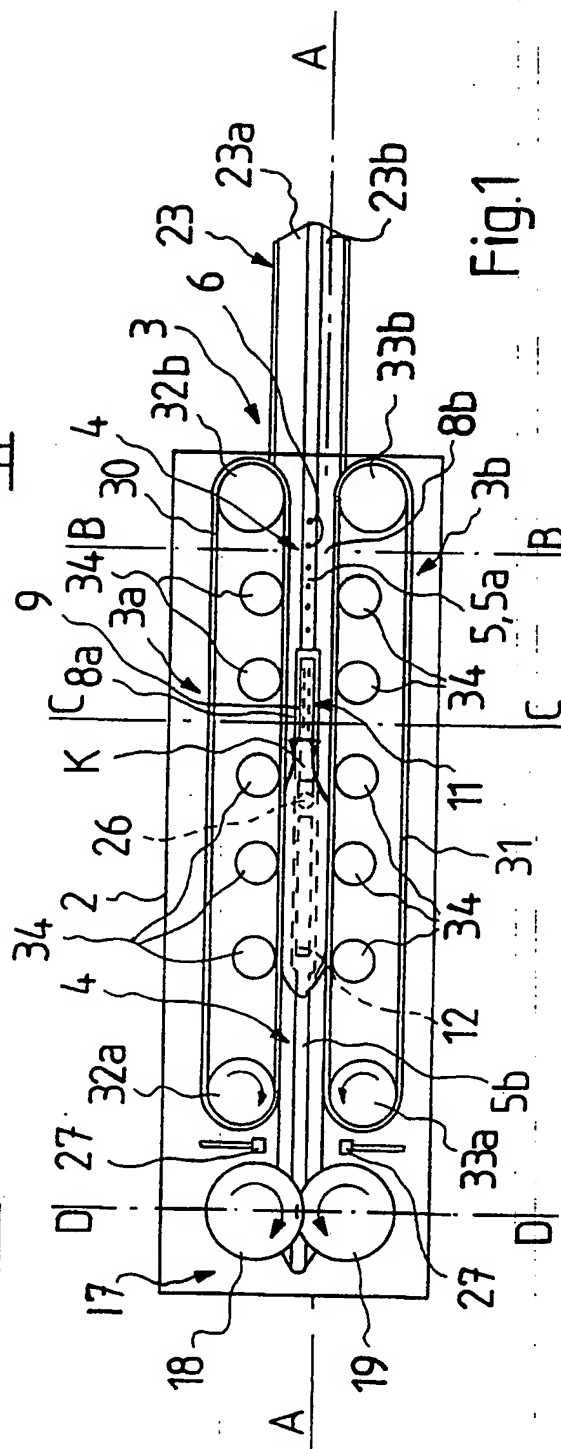
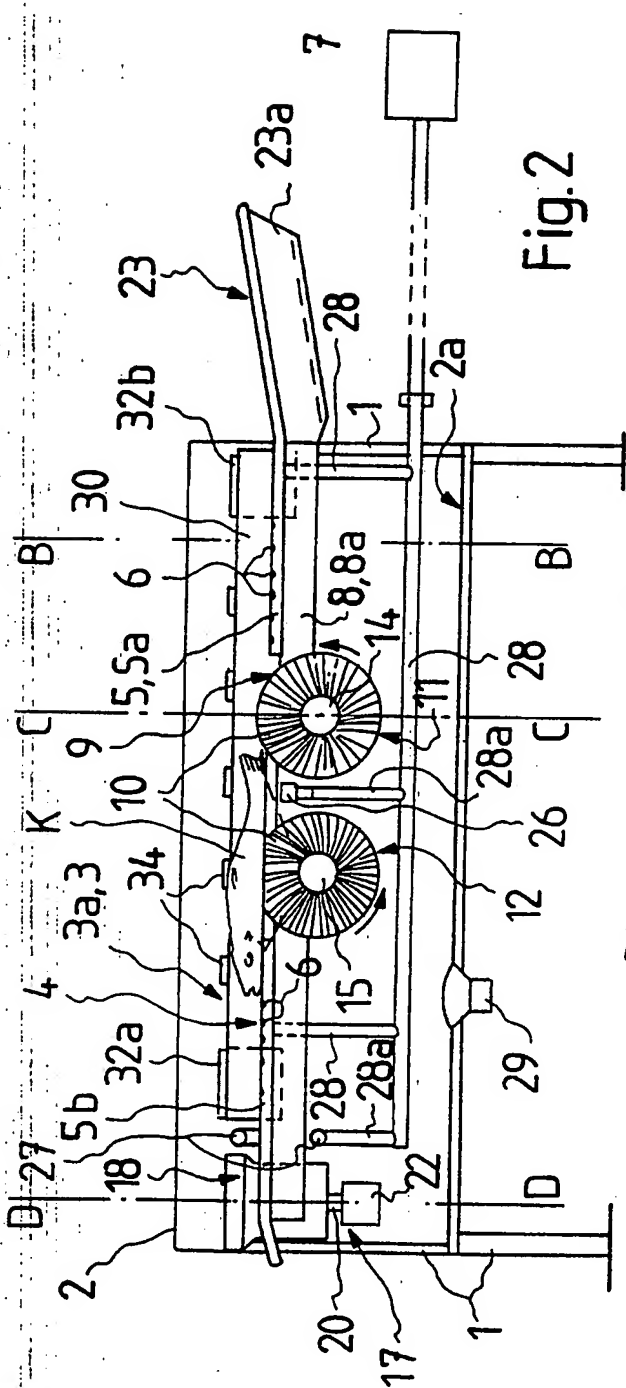
6. Apparatus according to any one of the preceding claims, characterized in that the apparatus is provided with a brushing device (10) for internal brushing of the fish, said device being fitted in conjunction with the supporting element (4).

7. Apparatus according to claim 6, characterized in that the supporting element (4) comprises a guide (8) of a cross-sectional form widening

in the downward direction, said guide comprising a part having an opening (9) through which one or more of the brushes (11, 12) of the brushing device (10) reach the interior of the fish conveyed along the supporting element.

8. Apparatus according to any one of the preceding claims, characterized in that the apparatus comprises a second brushing device (17) preferably comprising two brushes (18, 19) having essentially vertical rotatable shafts (20, 21), said brushes being located on either side of the supporting element (4) outside the coverage area of the conveyor, said brushing device serving as a means of cleaning the exterior of the fish.

9. Apparatus according to any one of the preceding claims, characterized in that the conveying elements (3a, 3b) of the conveyor (3) consist of two endless belts (30, 31), rollers (32, 33) around which the belts run, and runners (34) serving to maintain a suitable distance between the belts for the fish to pass through the apparatus.



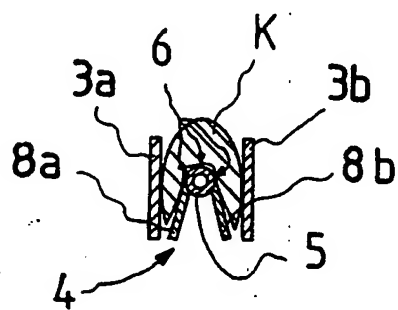


Fig. 3

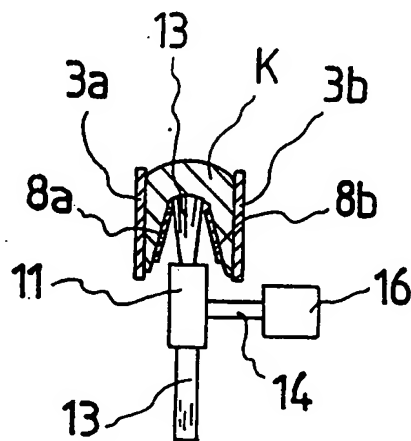


Fig. 4

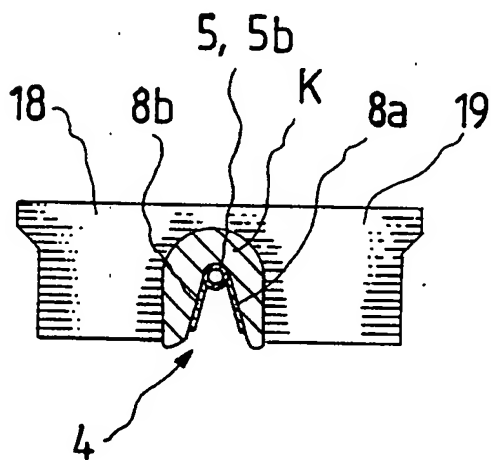


Fig. 5

INTERNATIONAL SEARCH REPORT

International Application No PCT/FI 89/00188

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC4: A 22 C 25/14		
II. FIELDS SEARCHED		
Minimum Documentation Searched ?		
Classification System	Classification Symbols	
IPC4	A 22 C	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched *		
SE, DK, FI, NO classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT*		
Category *	Citation of Document, ** with indication, where appropriate, of the relevant passages 12	Relevant to Claim No. 13
Y	SE, C, 216554 (ORY CLAYTON HELTON) 31 October 1967, see figure 8; claim 1 details 38, 39, 39A --	1-9
Y	US, A, 3165779 (H.C. TEETOR ET AL) 19 January 1965, see page 1, column 2, line 48 - line 70; figure 2 details 21 and 22 --	1-9
A	US, A, 3806616 (MENCACCI ET AL) 23 April 1974, see the whole document --	1-9
A	NO, C, 5848 (MARTIN EKENBERG) 20 May 1897, see the whole document -- -----	1-9
<p>* Special categories of cited documents: 10</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
11th December 1989	1989 -12- 27	
International Searching Authority	Signature of Authorized Officer	
SWEDISH PATENT OFFICE	Agneta Änggård <i>agneta änggård</i>	

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ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. PCT/FI 89/00188

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
SE-C- 216554	31/10/67	NONE	
US-A- 3165779	19/01/65	NONE	
US-A- 3806616	23/04/74	FR-A- 2130087	03/11/72